INFORMATION REPORT INFORMATION REPORT

CENTRAL INTELLIGENCE AGENCY

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COUNTRY USSR/East Germany

REPORT

SUBJECT Deflection Calculation for the Soviet AA Combined Height and Range Finder and Predictor AB/V

DATE DISTR. 2 June 1958

NO. PAGES 3

REFERENCES RD

DATE OF INFO.

PLACE & DATE ACQ.

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SOURCE EVALUATIONS ARE DEFINITIVE. APPRAISAL OF CONTENT IS TENTATIVE.

1. On the sphere, with the radius one, considered to be around the observer G, three definite angular velocities can be given at point Mo, at which the line of sight intersects the sphere. The horizontal angular velocity lies in the plane of the parallel of latitude going through Mo, below the angle of elevation YM, above the horizontal plane K. If the angular velocity measured in the horizontal /Kartenebene/ plane is designated WO, then the angular velocity in the plane of the parallel of latitude has the value cos YM. The vertical angle of velocity, the vertical angular velocity WY, lies in the plane of sight V passing through the meridian. Both components, the vertical and horizontal, give together the lateral component of velocity WO lying in the flight plane F. Therefore:

$$W_0^{1_2} = W_0^2 \cos^2 YM + WY^2$$

2. If the angular velocities are carried over at an interval equal to unity to the present position of target M at an interval equal to the slant range to present position eM, the following linear velocities are obtained: the lateral component of velocity WO cos YMEN /sic: probably W_0 cos YM/ running perpendicular to the plane of sight and represented by the distance MG or BM, and the vertical component of velocity eMWY on the line of sight GM and represented by the distance AB or GD. The resultant corresponds to the lateral component of velocity in the plane of flight and has the value eMWO. The true flight velocity D is arrived at with the aid of the third component of velocity, the velocity component of the change of range to present position, represented by the distance MA KW DM. This is the change of target speed of the range VE.

3. In the triangle MAB, the angle AMB is the angle of elevation for the velocity component MB; thus from:

$$\cos YM = V_e / MB,$$

we get the designation:

$$MB = V_e / \cos YM.$$

Since MB is the change of target speed in the horizontal plane, we can also write:

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STATE	X	ARMY	X	NAVY	X	AIR EV	X	FBI		AEC						

(Note: Washington distribution indicated by "X"; Field distribution by "#".)

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$$V_e K = V_e / \cos YM.$$

The target speed V is to be calculated from the right triangle MMB. It follows that:

$$V^2 = V_e^2 K^2 + W_0^2 \cos^2 YM^e M,$$

and:

$$\cos YM = eKM/e_M,$$

consequently:

$$V^2 = V_e^2 K^2 + W_0^2 e^2 KM.$$

When the altitude of the flight path remains the same, V is likewise the horizontal velocity VH.

The velocity component in relation to the line of sight, at a distance of unity and at a distance e/n:

$MA = DM_1$ change of target speed of the range ve

AB = CD vertical component of velocity $VY = WY^eM$

$BM_1 = MG$ lateral component of velocity $V_0 = W_0 \cos YM^eM = W_0\, eKM$

AM_1 x MD lateral component of velocity in the plane of flight

$$V_0' = W_0' e_M = e_M \sqrt{W^2 Y + W_0^2 \cos^2 YM}$$

MM_1 flight velocity V

$MB^1 = M_1G$ change of velocity of the horizontal range

$$VeK = Ve/\cos YM$$

F-plane of flight V-plane of sight G-instrument position

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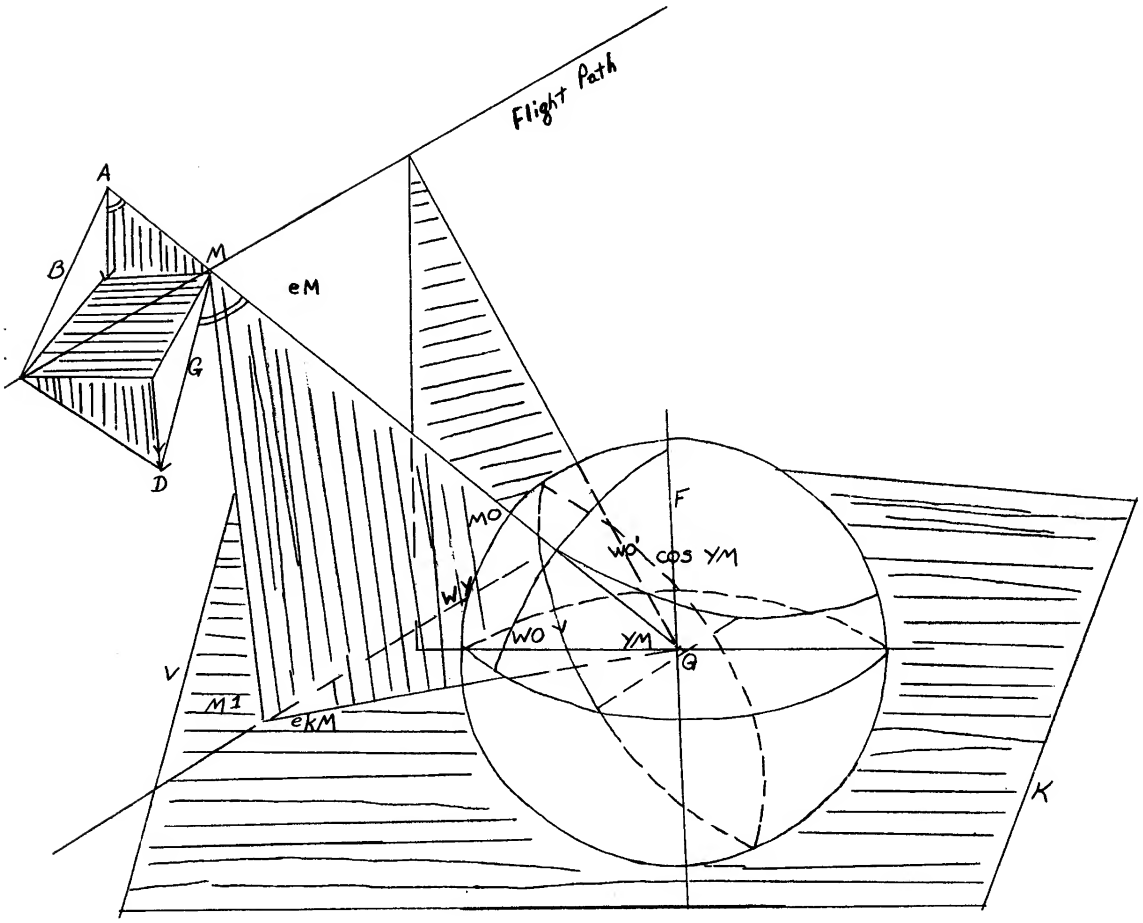

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$$V_{eK} = V_e / \cos YM.$$

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and:

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consequently:

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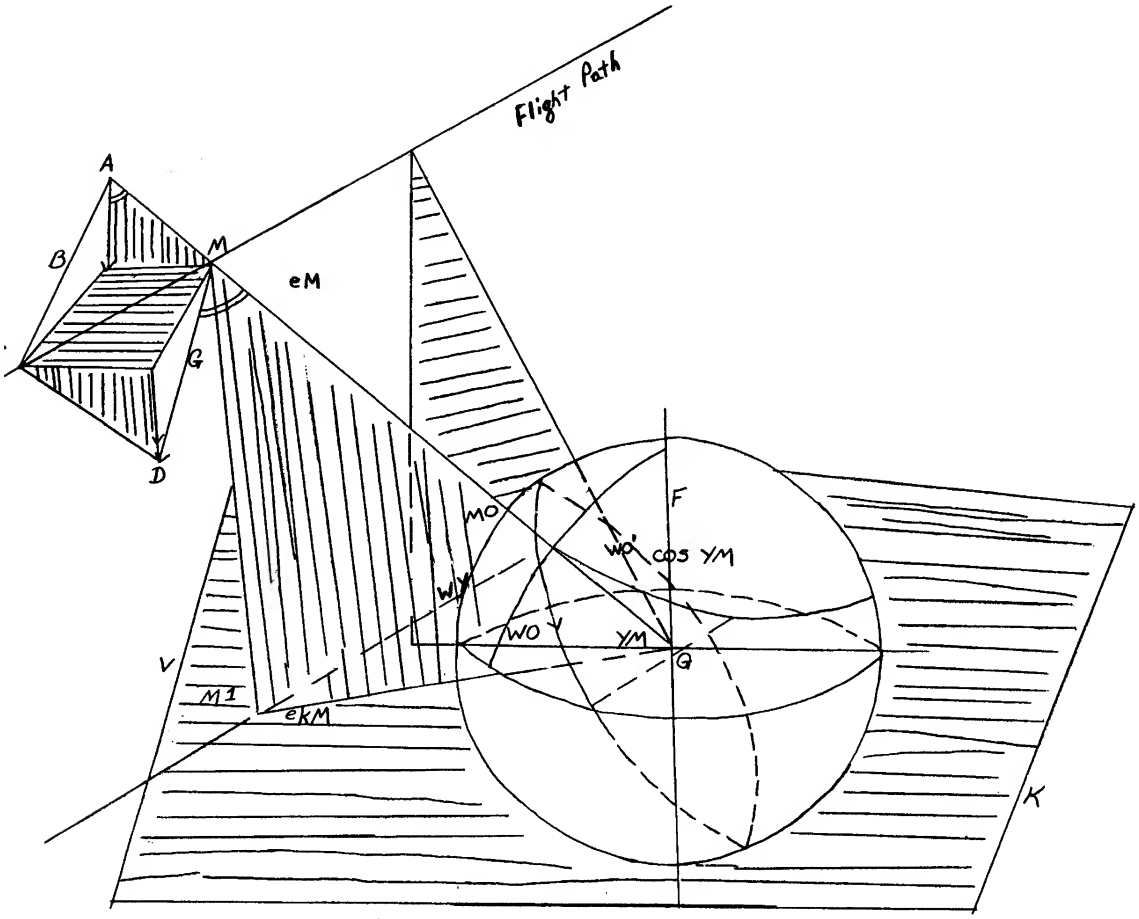

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